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Results of the 1982 Trumpeter Swan Survey in the Gulkana River Wildlife Habitat Area

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INTRODUCTION

In July, 1982, BLM opened almost the entire Denali Block to mineral exploration. In this area, the greatest possibility for oil and gas production occurs in a low-potential petroleum basin south of the Alphabet Hills. This basin underlies the extensive wetlands used by nesting trumpeter swans. According to a 1975 USFWS swan survey, approximately 75% of the swans seen in the entire Gulkana Basin were in this area (King, 1976). The Gulkana Basin, one of ten USFWS swan survey units in Alaska, supported the largest number of nesting trumpeter swans in the state in 1980. The area is obviously important for its trumpeter swan habitat, as well as its mineral potential.

STUDY AREA

The survey took place on Bureau of Land Management (BLM) administered land in the Gulkana River Wildlife Habitat Area. The 1981 BLM swan survey was conducted in the area included on the U.S. Geological Survey (USGS) topographic quadrangle Gulkana C-4. The 1982 survey covered this area and was expanded to include the Gulkana C-5 quadrangle. The study area is approximately 35 miles north of Glennallen, Alaska.

The survey included extensive wetlands with hundreds of ponds and lakes, ranging in size from less than an acre to Fish Lake, which is over 2,200 acres. The Mainstem of the Gulkana River, from above Canyon Rapids to below Sourdough was included. The West Fork Gulkana River was also included, from its junction with the Mainstem to several miles above the point where the West Fork branches. Elevations range from 2,000 to 3,100 feet above sea level (ASL).

The two quadrangles cover approximately 356,000 acres, of which approximately 293,000 acres (82%) were surveyed as suitable swan habitat: 100% of available swan habitat was surveyed.

METHODS

Swan surveys were conducted on 10 August 1982 and 12 August 1982. Surveys were flown 500-600 feet above the ground in a Cessna 180, and required 5.9 hours total flight time.

The single observer in the front seat traced a flight line across all suitable swan habitat on a USGS topographic quadrangle (scale 1"63,360). This observer was responsible for following the flight line, accurately plotting swan locations on the map, and assigning each location an appropriate number.

Numbers were assigned according to the system used by the U.S. Fish and Wildlife Service (USFWS). USFWS surveyed the Gulkana area for swans in 1968, 1975, and 1980. BLM used the identifying numbers USFWS had assigned to many of the lakes and ponds when swans were seen again at those locations; when swans were seen at a new location, the next number in the series was assigned. Each quadrangle has its own number series.

Two observers in the rear seat looked for swans, and were assisted in this effort at times by the pilot. BLM was fortunate to have the services of Ken Bunch, Gulkana Air Taxi, Glennallen. When swans were sighted, Ken was able to circle tightly over the area to get a better view. He was also adept at returning the plane to the point where he deviated from the line of flight, and at continuing on the desired course.

One observer in the rear seat recorded swans sighted, site number, and whether or not a nest was seen in the area. Swans were recorded as singles, pairs, broods, and flocks. Flocks consisted of three or more adult swans at a single location with no broods present. In some cases, two pair may have been recorded as a flock of four. A single pair with a brood was recorded separately from other swans at the same location.

Two observers were extrememly useful because they could cover territory both to the right and left of the flight line; therefore, less flight miles were required.

RESULTS

Results from the 1982 survey are presented in Tables 1-5; results from previous surveys are included in Tables 1-4 for comparison. This year's survey indicates that there was a general decline in production for this portion of the Gulkana Basin compared to the last survey.

Fifty-two observations were made on fifty different locations in the Gulkana C-4 quadrangle. Thirty of these sites were not previously documented in past surveys as having been used by swans. No lakes supported two broods in the 1982 survey. In 1981 two broods were observed on USFWS lake #5. This year two pair were observed at that site.

Elevations of lakes on which swans were sighted range from 2,050 feet to 2,450 feet ASL. This is a higher and wider range of elevation than observed last year, stemming mainly from the fact that swans were present on Canyon Lake (2,450 feet ASL) where none were observed in the 1981 survey.

Table 1: Swan observations from trumpeter swan surveys of Gulkana C-4 quadrangle

Year	# Observations	# Broods	# Pairs	# Flocks	# Singles	# Paired Birds	# Flocked Birds	# Young	# Total Swans	Observers
68	14	5	13	-	1	26	-	21	48	King, Bartonek USFWS
75	33	8	25	2	6	50	6	21	83	King, Schoenfelder USFWS
80	55	16	48	4	3	96	25	56	180	King, Conant USFWS
81	49	13	41	5	3	82	69	58	212	Daum, Byrne, Bunch BLM
82	51	10	38	6	7	76	38	32	153	Henderson, Byrne, French Bunch BLM
	+6	-23	-7	0	+133	-7	-45	-45	-28	% change of 1982 survey from 1981 survey

Table 2: Summary data from trumpeter swan survey of Gulkana C-4 quadrangle

Year	Average Brood Size	% Pairs with broods	% young in population	Square Mile Per Pair	Square Mile Per Brood	Square Mile Per Swan
68	4.2	38	44	16	41	4
75	2.6	32	25	8	26	2
80	3.5	33	31	4	13	1
81	4.5	32	27	5	16	1
82	3.2	26	21	5	20	1
	-29	-19	-22	0	+25	0

% change of 1982 survey from 1981 survey

Table 3: Swan observations from trumpeter swan surveys fo Gulkana C-5 quadrangle

Year	#obser vations	# broods	# pairs	# flocks	# singles	# paired birds	#flocked birds	# young	# total swans	Observers
68	25	4	20	2	3	40	7	14	64	King, Bartonek USFWS
75	22	5	17	1	4	34	3	19	60	King, Schoenfelder "
80	36	8	31	4	1	62	23	30	116	King, Conant USFWS
82	50	8	39	5	6	78	17	25	126	Byrne, Henderson, French Burch BLM
	+39	0	+26	+25	+500	+26	-26	-17	+9	% change of 1982 survey from 1980 survey

Table 4: Summary data from trumpeter swan surveys fo Gulkana C-5 quadrangle

Year	Average Brood Size	% pairs with broods	% young in population	square mile per pair	square mile per brood	square mile per swan
68	3.5	20	22	13	64	4
75	3.8	29	32	15	51	4
80	3.8	26	26	8	32	2
82	3.1	21	20	7	32	1
	-18	-19	-27	-13	0	0

% change of 1982 survey from 1980 survey

Table 5: Results from 1982 trumpeter swan survey comparing figures from the entire study area with the individual quad maps surveyed.

	Combined Area	C-4	C-5
Square miles habitat	459	204	255
Miles flown	288	140	148
% Habitat Covered	100	100	100
# observations of swans	101	51	50
# broods	18	10	8
# pairs	77	38	39
# flocks	10	6	5
# singles	13	7	6
# paired birds	154	76	78
# flocked birds	55	38	17
# young	57	32	25
# total swans	279	153	126
Average brood size	3.2	3.2	3.1
% pairs with broods	23	26	21
% young in population	20	21	20
sq.mi./pair	6	5	7
sq.mi./brood	26	20	32
sq.mi./swan	2	1	2

One hundred-fifty-three birds were observed, resulting in a 28% decrease in swan numbers. The difference in flocked birds for the two surveys accounts for much of the decline in total swans observed. Fewer flocked birds (38 in 1982 compared to 69 in 1981) were observed, possibly because of the earlier timing of the 1982 survey (12 August compared to 25 August in 1981). Swans from outside the area had not yet begun to stage for the fall migration.

Productivity declined as the number of broods (23%) and number of young (45%) were substantially down from the previous survey. Average brood size decreased from 4.5 to 3.2 young.

In the Gulkana C-5 quadrangle, 50 swan observations were made at 49 sites, 41 of which were new. None of the lakes supported more than one brood. Elevations of lakes on which swans were observed ranged from 2,150 to 2,750 feet ASL.

Results are similar to those from the 1980 survey although production was down slightly. Number of young (-17%), average brood size (-18%), 5 of pairs with broods (-19%) and % young in the population (-27%) all showed small declines from 1980 calculations.

Table 5 presents the results of the two quadrangles surveyed and the study area as a whole. A large number of flocked birds accounted for a larger number of total swans in the Gulkana C-4 quadrangle. Otherwise, the numbers were similar for both areas. Because more square miles of habitat were surveyed in the C-5 quadrangle, the sq.mi./pairs, sq.mi./brood, sq.mi./swan statistics were proportionately larger.

Even though the area surveyed in 1981 was small, USFWS personnel felt the high productivity measured was probably indicative of the entire Gulkana area (King et al 1981). If that is the case, then the slight decline in productivity as determined from the 1980 and 1982 surveys of the C-5 quadrangle is an underestimate of the decrease. The real decline in production is probably similar to that calculated for the C-4 quadrangle using data from the 1981 and 1982 surveys.

DISCUSSION

Whereas most trumpeter swans in Alaska nest below 500 feet, those in the Gulkana Basin are found between 2,000 and 3,100 feet. In addition, Gulkana had the lowest long-term mean summer temperatures of six main swan breeding areas (Hansen et al 1971). These factors effectively shorten the season available for nesting. Obviously swans, which require 140-154 ice-free days to nest successfully, are susceptible to yearly weather fluctuations in such a location. The steady increase in population since 1968 may reflect a period of good weather, and

cannot be considered a healthy population of trumpeter swans, especially in the face of mineral exploration and development.

RECOMMENDATIONS

If BLM issues an oil and gas lease, the easiest way to prevent disturbance to nesting swans is to restrict human activity in the area to the period September 15 - April 15. Exploration during the winter, and at elevations greater than 3,000 feet, will have no effect on the swans.

However, if development takes place, seasonal restrictions would be improbable. Instead, specific areas important to swans should be protected. BLM's Southcentral Management Framework Plan (MFP) recommends buffer strips around water bodies used by waterfowl. To implement this recommendation, BLM first needs to determine what size buffer strips are necessary for adequate protection, and which water bodies should be protected.

A single flight over the nesting grounds is inadequate to establish which lakes are most important to swans. Hansen et al (1971) discussed the frequency of brood movements between nest sites and other lakes, and delineated nesting and brood-rearing territories. In addition, although Gulkana Basin data show yearly reuse of some lakes, paired swans are seen at new locations each year. Obviously, buffer zones around single lakes should be ineffective.

Repeated flights in a single season, over areas such as the potential petroleum basin, should be made. This would provide information on nesting success, and nest location, as well as on swan territories and movements. More accurate information could be obtained by marking and/or tagging swans. If such a study were initiated before development, and was continued during operational activities, the effect of human disturbance on swan activity could also be monitored.

Appropriate size of buffer zones will be more difficult to determine than proper location of zones. Even if large enough to isolate entire nesting territories from disturbance, zones may not encompass enough area to allow swans to respond to other environmental variables. Adverse weather conditions, likely to cause a decline in productivity, might be mitigated by enlarging the area protected from disturbance. Correlation of weather data and nesting success would help explain the importance of this environmental variable to swans.

It would also be useful to know if swans prefer certain types of water bodies, and what the characteristics of those preferred water bodies might be. In fact, the Southcentral MFP states as a support need for waterfowl management, the determination of lake characteristics.

References

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